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UNITED STATES DEPARTMENT OF AGRICULTURE DEPARTMENTAL CIRCULAR

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No. 8

IMPORTANT RULING.

COMPTROLLER'S DECISION.

(Contribution from Office of the Secretary.)

In recent correspondence with this department the following principles have been enunciated by the Comptroller of the Treasury:

Where an officer or employee is required to go from one place to another within the limits of his official station he can not be considered as in such a travel status as would entitle him to reimbursement of traveling expenses. However, if necessary expenses of an officer or employee for transportation, such as street-car fare and livery, have been incurred at an official station for the accomplishment of work specifically appropriated for and his duties are in the nature of a field service he is entitled to reimbursement of same, not as a reimbursement of traveling expenses as such, but of expenses necessarily incurred in connection with the purpose for which the specific appropriation was made. (Dec. dated Nov. 16, 1915.)

THE WEEKLY NEWS LETTER.

The circulation of the News Letter is now rigidly restricted to certain specified classes of readers and no additions are being made to the miscellaneous list which was established when the publication was started. It is not the department's purpose to secure a large circulation for the News Letter nor to make it in any sense a popular agricultural weekly. The purpose of the News Letter is to carry the department's regulations and discoveries to those persons who are in a position to disseminate this information to the general public.

Through the News Letter the department's own employees and collaborators, county agents, and crop correspondents are kept informed officially of the more important practical developments in agriculture and thus are enabled to convey helpful information to their neighbors and fellow workers. The News Letter is sent also to the agricultural and general press, that editors may select such material for republication as is, in their

opinion, of direct value to their subscribers. Any one publication, however, can not be expected to use all of the material in each issue of the News Letter. Many editors, in addition to selecting topics, condense or otherwise edit this material. It therefore is desirable that the crop correspondents and other persons connected with the department obtain all the information that the department thus puts out, and secure it in full and official form if they are to use it as a basis for action or as a guide in their work. For this reason the News Letter occasionally contains material which has already been sent out in mimeographed form to selected classes of publications in certain localities.

These mimeographed articles are prepared and issued by the department when it is desired to place material in the hands of editors more rapidly than could be done through the medium of the News Letter itself.

The department thus confines the circulation of the News Letter to agencies which it is believed are the most effective in disseminating agricultural information. The purpose of the publication is to bring to the attention of the people through these various channels the information which the Department of Agriculture has collected for their benefit. Much of this information is, of course, to be found also in other form in more formal or technical publications of the department, but these publications are not so readily available to so large an audience.

In addition, however, the News Letter contains many additional seasonal and other articles by specialists which are not issued in any other form.

THE DEPARTMENTAL CIRCULAR is issued as a convenient means of intercommunication of official information among the personnel of the Department of Agriculture. Its circulation, therefore, will be limited to those having official connection with the department. Its editorial policy will be determined wholly by the specific class of readers for whom it is published and, therefore, may depart somewhat from the editorial policy governing material issued for the public. While the material to be published will by no means be confidential, the department can not extend the circulation of this publication beyond its own employees and official collaborators.

SCIENTIFIC CONGRESS.

The Second Pan American Scientific Congress will meet in Washington this month under the auspices of the United States. The congress will open on December 27 and adjourn on January 8.

The First Pan American Scientific Congress was held at Santiago, Chile, in December, 1908. Previous congresses had been held by the Republics of Latin America, but the Santiago congress was the first in which the United States took part. Its purpose is to facilitate the exchange of knowledge and to bring about a better understanding of the ways in which the American Republics can work for the advancement of science, the increase of culture, and the promotion of trade and commerce.

The congress will be divided into nine sections each in charge of a chairman, the sections and the chairmen being as follows:

- I. Anthropology. Mr. William H. Holmes.
- II. Astronomy, meteorology, and seismology. Mr. Robert S. Woodward.
- III. Conservation of natural resources, agriculture, irrigation, and forestry. Mr. George M. Rommel.
- IV. Education. Mr. P. P. Claxton.
- V. Engineering. Gen. W. H. Bixby.
- VI. International law, public law, and jurisprudence. Mr. James Brown Scott.
- VII. Mining and metallurgy, economic geology and applied chemistry. Mr. Hennen Jennings.
- VIII. Public health and medical science. Gen. Wm. C. Gorgas.
- IX. Transportation, commerce, finance, and taxation. Mr. L. S. Rowe.

Each section is divided further into subsections, of which there are 45 in all. The subsections of Section III, which is the one of most direct interest to members of the Department of Agriculture, are as follows:

- No. 1. Conservation of Mineral Resources.
- No. 2. Conservation of forests.
- No. 3. Conservation of water for power.
- No. 4. Irrigation.
- No. 5. Conservation of the animal industry.
- No. 6. Conservation of the plant industry.
- No. 7. Marketing and distribution of agricultural products.

These subsections will hold a number of conferences on topics on which eminent authorities have been invited to prepare papers.

Among these are: The conservation, through Government ownership and control, of the natural resources of a nation; a national forest policy and the relation of forestry to the future development of Central and South America; governmental participation in irrigation development; the feasibility of uniform regulations for the different American countries to prevent the introduction and dissemination of animal diseases; the eradication of animal diseases; Pan-American cooperation in plant quarantines; and the effect of the Panama Canal upon the distribution of farm products.

All members of the congress are entitled to attend its sessions, to take part in its debates, and to receive a copy of the publications issued by the executive committee. There are no membership fees of any kind. The congress will be composed of the official delegates of the countries represented, the representatives of the universities, institutes, societies, and scientific bodies in these countries, the authors of papers to be read at the conferences, and such other persons as the executive committee may invite.

TESTING CONCRETE.

The Office of Public Roads and Rural Engineering has begun a series of tests at Arlington, Va., to determine the proper thickness of the concrete base for roads of different types when subjected to loads of different magnitudes and when placed on various kinds of subbase. In view of the increasing intensity of wheel loads to which roads are now being subjected, the solution of this problem is becoming of great economic importance. Steps have been taken to mold slabs of varying thicknesses on several kinds of subbase and test them to destruction, the load being applied through various kinds of paving surface.

Concrete roads are now being built throughout the country with numerous kinds of aggregate and under various construction methods. There is a noticeable difference in the amount of wear suffered by these surfaces, and it is a much-mooted question as to which kind of aggregate will prove most economical under particular conditions of traffic and location of source of supply.

In order to gain information of value in this connection, an instrument has been devised and constructed in the concrete laboratory at Arlington, Va., for the purpose of measuring the amount of wear of concrete roads of different types. Periodical wear measurements will be taken of concrete-road surfaces on which the traffic conditions are known.

It has long been known that concrete is not elastic, but attains permanent deformation under working loads. During the

course of a series of tests on reinforced concrete slabs recently made by the Office of Public Roads and Rural Engineering, and now being continued, it was very forcibly brought to the notice of the observers that the concrete continued to deform slowly as long as the load was applied. This fact is significant, as it helps to explain certain stress conditions in concrete roads and bridges when subjected to temperature changes. In order to study this phenomenon more fully, a series of tests has been begun to determine the "flow" of concrete and reinforced concrete when subjected to direct compression and to bending stresses. Working conditions will be maintained on the specimens as long as they exhibit "flow," and finally the specimens will be broken in comparison with like specimens that have not been previously loaded.

JOURNAL OF AGRICULTURAL RESEARCH.

It has been decided that the steady development of the Journal of Agricultural Research warrants the change from monthly to weekly publication, and on October 2, 1915, the first number of the new weekly was issued. The Journal of Agricultural Research was established on October 1, 1913, for the purpose of recording results of scientific researches in agriculture in convenient form for technical reference. The distribution of the Journal is restricted to institutions throughout the world whose work bears either directly or indirectly upon agricultural research and the name of no individual is carried on the permanent free mailing list.

During the first year of its existence the Journal contained papers contributed by investigators of the Department of Agriculture. Plans had been perfected, however, in cooperation with the Association of American Agricultural Colleges and Experiment Stations, so that beginning with Volume III articles contributed by investigators of the various State experiment stations also were included.

For those who desire to purchase the Journal the Superintendent of Documents maintains a subscription list, the price of the weekly magazine being \$3 per year. Single copies may be purchased from the Superintendent of Documents at the price of 10 cents per copy.

CHEMISTRY NOTES.

(Contribution from Bureau of Chemistry.)

Vinegar from cane and sorghum juices.—A project is being conducted by the food investigation laboratory to find out whether a palatable vinegar can be made directly from cane and sorghum juices, and if

so, to determine its composition; also to ascertain the commercial possibilities of the manufacture of vinegar from these sources. It is proposed during this season to make the vinegar on a limited scale, in order to permit its quality to be ascertained. Analyses of the material used and of the finished vinegar will be made.

Branch laboratory moved to Minneapolis.—The branch food and drug inspection laboratory which was located in the old capitol building at St. Paul has been moved to the Federal office building in Minneapolis, Minn. This transfer was made because an opportunity was afforded to secure satisfactory quarters in a Federal building.

ENTOMOLOGY ABSTRACTS.

(Contribution from Bureau of Entomology.)

Pea aphid and forage crops.—During the past 15 or 16 years a plant louse, *Macrosiphum pisi*, has periodically been very destructive to field and garden peas, sweet peas, and vetches, and to red and crimson clovers, in the eastern half of the United States. In Department Bulletin 276, "The Pea Aphid with Relation to Forage Crops," Mr. J. J. Davis gives an extended account of its life history, habits, and natural enemies. The species winters on red and crimson clovers, and many pass the entire year on these plants, although many others migrate in summer to peas and vetches. It is thus seen that by controlling this insect in the clover field when it appears to be increasing unduly, through cutting or pasturing the clover before migration to other crops takes place, most of the aphides will be killed and the destructive outbreaks in these and other crops may be checked. Weather conditions are also an important factor in the natural control of the pea aphid, not only directly but indirectly through their effect on the aphid fungus and parasites.

Grasshoppers on sugar beets and truck crops.—Four species were mainly responsible for the very serious grasshopper outbreaks that occurred in Kansas and neighboring States during the years 1911, 1912, and 1913. These are native, nonmigratory species whose ravages have been limited to crops in the neighborhood of their birthplace. Their damage to vegetable crops and sugar beets was especially severe, and people were obliged to combat the insects in every way possible. As outbreaks of this character will recur from time to time it is important that the most effective control measures be widely known. To supply this need Farmers' Bulletin 691, "Grasshoppers and Their Control on Sugar Beets and Truck Crops," by F. B. Milliken, has been issued. The four species are briefly described and their life history and habits outlined. The larvæ

of bee flies and of blister beetles are shown to be among their most effective natural enemies. The best methods for controlling these grasshoppers are the destruction of their eggs by deep plowing or by harrowing and disking the ground in which these are laid and by the use of a poisoned bran mash, the hopperdozer, poultry and hogs, and by burning dead vegetation to destroy the young and adults. Special measures are given for the protection of sugar beets, truck crops, and gardens.

Grasshopper outbreak in New Mexico.—Although more or less important outbreaks of the long-winged grasshopper (*Dissosteira longipennis*) have occurred in the past, very few actual data regarding this species appear to have been gathered. Advantage was therefore taken of the notable outbreak in the Pecos Valley of New Mexico during the summer of 1913 to study the grasshopper in the field. Over an area of 400 to 500 square miles the prairie grasses, grain, and garden crops were in great part devastated. Herds of cattle were forced to travel 11 to 13 miles for grazing, and freight and passenger trains were repeatedly stopped by grasshoppers massing upon the railroad tracks. The outbreak originated from a tremendous swarm of adults flying from some unknown point to the north and settling in sand hills near Elida, N. Mex., during August and September, 1912. The following May grasshoppers were emerging from the sand "by the million." Department Bulletin 293, "The Grasshopper Outbreak in New Mexico During the Summer of 1913," by Harrison E. Smith, gives a full account of this outbreak and of the food and other habits of the grasshopper, its enemies, and the means used for its artificial control.

Department Bulletin 278, "Miscellaneous Insecticide Investigations," by E. W. Scott and E. H. Siegler, Department Bulletin 295, "The Zimmerman Pine Moth," by Josef Brunner, and Farmers' Bulletin 695, "Outdoor Wintering of Bees," by E. F. Phillips and George S. Demuth, have been discussed in recent issues of the Weekly News Letter.

WEATHER REVIEW NOTES.

(Contribution from the Weather Bureau.)

Account of hurricane of Sept. 29, 1915.—The great hurricane of September 29, 1915, which spread such wide devastation along the coast region of Louisiana and Mississippi not only cost a number of lives and wrecked many buildings but also caused great destruction of crops. This storm is described by Isaac M. Cline, of the Weather Bureau, in the September issue of the Monthly Weather Review, pages 456-466; the article is accompanied by seven charts.

Climatic subdivision of the United States.—In dealing with the climatology of so large and varied a country as the United States it is almost imperative that the country be divided into climatic sections or provinces. A suggestive article on this subject by Prof. Ward, of Harvard University, "Climatic Subdivisions of the United States," is quoted in the September number of the Monthly Weather Review, pages 467-468.

POTATO EXHIBITION.

An exhibition of potato varieties was held by the department on December 9, 10, and 11, when 12 varieties, exclusive of experimental seedlings and unclassified specimens, were shown, together with a number of sample packages of potatoes graded for the retail market.

This is the third such exhibition that the department has had. Its purpose was to furnish information to the various workers of the department in regard to the different qualities of recognized varieties of potatoes. It is the belief of the specialists directly engaged in this work that the industry would benefit greatly by a reduction in the number of varieties that are now grown commercially. Seedmen's catalogues often list from 200 to 300 kinds of potatoes. This practice, it is said, is worse than useless, for it merely confuses the farmer and hinders community adoption of one or two varieties selected for their adaptability to particular soil and climatic conditions.

It is believed that if each community would confine itself to the one or two varieties best suited to its own conditions, not only would production be greater but better prices would be obtained on the market. The sample packages of graded potatoes on exhibition displayed the possibilities of putting up the product in a way that will attract the average customer and bring a higher price than unclassified tubers sold in bulk.

In addition to the regular commercial varieties shown, there were samples of domestic salad potatoes. Previous to the outbreak of the war, hotels and restaurants which had to meet a large demand for potato salad made a practice of importing the potatoes they used for this purpose from abroad. While it is perfectly possible to make potato salad from any kind of potato, the best tubers for the purpose are not those which contain the largest percentage of starch. If more attention were paid to the selection of proper varieties and the growing of potatoes for definite purposes, it is believed that the demand which exists in the large cities for potatoes especially adapted to salad could be met by domestic supplies.

Potato bread, which contains approximately 25 per cent of potato flour and 75 per cent of grain, was also exhibited.

VOLATILE ESTERS IN CITRUS OILS AND EXTRACTS.

Among the numerous compounds which are known to exist in citrus oils the esters form an important group, some of the finer characteristics of the odors of the oils being due to these compounds. A method was needed for the quantitative determination of these esters in orange and lemon oils, since by this determination data could be secured which would be useful in judging the purity of samples of oil, and possibly in estimating their flavoring value.

The common method for estimating esters by saponification with alkali can not be applied to citrus oils because of the interference of the aldehydes present. A method has been devised, however, by A. R. Albright and C. O. Young, in which the interference of aldehydes is obviated by combining these bodies with semicarbazide. Since the resulting carbazone does not consume any alkali, esters can be estimated in its presence by saponification. It has been shown that the method yields good results. It is described in detail in the Journal of the American Chemical Society for October, 1915.

BIOLOGICAL NOTES.

(Contribution from Biological Survey.)

American moles.—In this monograph, published as North American Fauna No. 38, Dr. H. H. T. Jackson outlines the essential facts in the life history, including their habits and economical importance, of five genera of the family Talpidae native to North America: *Scapanus*, the common mole, and *Neurotrichus*, the little shrew-like mole, both of the Pacific slope; and *Scalopus*, the common naked-tailed mole; *Parascalops*, the hairy-tailed mole; and *Condylyura*, the star-nosed mole belonging to the Atlantic watershed. The shrew-like mole, the hairy-tailed mole, and the star-nosed mole are mainly beneficial and have little effect on agriculture, as they inhabit, for the most part, undeveloped regions. The two others—the common mole and the naked-tailed mole—are injurious. They destroy earthworms and make unsightly ridges in lawns, and their tunnels also offer means of ingress for small rodents which injure tubers, roots, and planted seeds. Certain moles, particularly in the Northwest, are extremely detrimental to agriculture, and this monograph defines the distribution of the various species in such a way as to be of practical importance in connection with their control.

Pocket gophers.—North American Fauna No. 39 may be considered as part second of Fauna No. 8, which is a monograph on the Geomyidae, exclusive of the genus *Thomomys*. In Fauna No. 39, Mr. Vernon

Bailey describes the species and subspecies of this genus and adds one new species. The habits and economic status of the animals discussed are described, as well as methods of controlling them when they become obnoxious. The use of pocket gophers, which are widely distributed and extremely injurious to agriculture, is suggested as food for man. Because of the many forms of the genus which had to be described, a publication of 136 pages was necessary and, in consequence, the edition is limited. Copies may be obtained only from the Superintendent of Documents.

PLANT INDUSTRY REVIEWS.

(Contribution from Bureau of Plant Industry.)

Cereals in South Dakota.—The experiments with cereals at the Belle Fourche Experiment Farm, near Newell, S. Dak., have been conducted for the following purposes: (1) To determine the best crops, varieties, and races for that section; (2) to improve the better varieties by selective breeding; (3) to determine the best methods of cereal production; and (4) to correlate differences in production with climatic and soil conditions in order to determine the principles upon which the best practices are based. An account of these investigations intended to include results for a period of six years, not heretofore reported, was issued on October 28 as Bulletin 297 of the department series, by Cecil Salmon. The results here given are applicable in general to western South Dakota, northeastern Wyoming, and southeastern Montana. The variations in soil and climate within this section, however, are considerable. To determine just how far the results obtained at Newell are applicable to any other locality, a comparison of soil and climatic conditions is necessary. Data for such comparisons are presented.

Zacaton for paper making.—Zacaton grass (*Epicampes macroura* Benth.) may prove to be a valuable paper stock, although at present it is a waste product and flourishes in a region remote from the paper-manufacturing sections. The work of testing this plant, which has progressed to a point where a preliminary publication of results is desirable, is described in Bulletin 309 of the department series, issued on November 4, by Charles J. Brand and Jason L. Merrill.

The bonavist, lablab, or hyacinth bean.—A bulletin describing the cultural and varietal characteristics of the bonavist, a markedly drought-resistant forage plant, was issued on November 18, by C. V. Piper and W. J. Morse, being No. 318 of the department series. The bonavist is well adapted to planting with some supporting crop, and it is closely comparable to the cowpea in value for planting in corn.

Handling citrus fruits.—Farmers' Bulletin 696, by H. J. Ramsey, issued on November 10, points out some of the factors gov-

erning the merchantable condition of citrus fruit, particularly the relationship of harvesting and handling methods to losses from decay in transportation and at the markets. No system of marketing can procure for the grower the highest market price for his product unless it is delivered in sound condition, so that it will remain in good merchantable condition for a sufficient time to allow for proper distribution to the consumers. If the grower can not do this, the money and labor invested in his orchard enterprise are largely, if not wholly, wasted.

Plant introductions.—Inventory No. 35 of the Office of Foreign Seed and Plant Introduction, giving definite details concerning the plant material imported during the period from April 1 to June 30, 1913, was issued on November 9, 1915. The field work accomplished by explorers during that period is reviewed, and some of the more interesting plants described are pointed out. The inventory includes collections made in the Shantung Province of China and some new potato varieties obtained from southern Chile and Peru.

Yuma Experiment Farm.—The work of the Yuma Experiment Farm is planned to throw light on the problems common to agriculture in the lower Colorado River region. Circular No. 7 of the Office of Western Irrigation Agriculture, issued on October 18, reports the more important features of the work during the year 1914 and discusses briefly the development of agricultural industries on the Yuma project. Many experiments under way were continued. Breeding, variety tests, and cultural experiments were conducted with various field crops. Production and variety tests of vegetables were included. Many varieties of fruits, nuts, and perennial ornamentals also were tested.

Sclerotinia disease of ginseng.—For a number of years two species of *Sclerotinia* have been recognized as probable causes of the rotting of the roots of ginseng (*Panax quinquefolia*), but the pathogenicity and identity of these fungi have not been proved. Inoculation experiments designed to establish the pathogenicity of these organisms are described in a paper by Joseph Rosenbaum, published in the Journal of Agricultural Research for November 15, detailing the considerations on which the conclusions as to the identity of the two pathogens are based.

Hosts for *Peridermium pyriforme*.—Details concerning the discovery of two new hosts for the rust of pines caused by a certain fungus the aërial form of which has been described as *Cronartium pyriforme* are given in a paper by G. G. Hedgcock and W. H. Long, published in the Journal of Agricultural Research for November 15. It is now known that *Peridermium pyriforme* causes three forms of disease on pines—one with

slight or no hypertrophy, a second causing a fusiform or spindle-shaped swelling, and a third form which causes the formation of globose galls.

Fusarium tuber rot of potatoes.—The deterioration of tubers of the Irish potato (*Solanum tuberosum*) is induced by a variety of causes. Economically the most important of these are the organisms *Phytophthora infestans*, *Fusarium* spp., bacteria, and miscellaneous fungi, including *Rhizopus nigricans*. An increasing number of rotting tubers indicated the existence of several types of a rot not hitherto described. The tuber rots considered in a recent laboratory study of these diseases are all of the stem-end and wound-parasitic type, and an illustrated account of the results is given in a paper by C. W. Carpenter, published in the Journal of Agricultural Research for November 1. The object of this paper is to demonstrate the parasitic nature of certain species of *Fusarium* and to contrast these organisms and the resulting types of deterioration with those already recognized.

Dissemination of wilt.—A preliminary note recounting the results of studies made by Frederick V. Rand, throwing light upon the dissemination of the bacterial wilt of cucurbits through the instrumentality of insects is published in the Journal of Agricultural Research for November 8. The experiments described seem to warrant the tentative conclusion that the wilt bacteria are carried over the winter by hibernating leaf-eating beetles and inoculated into the cucumbers as they feed upon the young leaves. It would seem that not all hibernating beetles carry the disease, but only those, or some of those, which have previously feed upon wilted plants.

Mosaic disease of tobacco.—The embryonic transmission of the mosaic disease from parent to offspring has not been observed in tobacco plants. It is of considerable interest to know how closely the embryo may be invested with tissues bearing the infectious principle of the mosaic disease. The results of experiments designed to test the points involved are reported in a paper by H. A. Allard, published in the Journal of Agricultural Research for November 8. Although the disease sometimes appears particularly malignant, so that normal capsule development is almost completely inhibited and few viable seed are produced, plants from such seed are healthy, and one can only wonder what protects the embryo so securely from the mosaic disease, even though intimately associated with and nourished by infective parental tissues.

Root rot of ginseng.—In the summer of 1913, roots of ginseng which showed a peculiar dry-rotted condition about the crown were obtained from a garden near Cleveland, Ohio. Because of the unusual character of these lesions, numerous isolations were made

from them, and in all cases an Alternarialike fungus closely resembling *Alternaria panax* Whet. was secured in pure culture. In order to determine whether these two fungi were identical, a series of inoculations on roots and tops were made with both cultures. In addition, a study was made of their macroscopic and microscopic appearance. The results of these investigations, begun during the summer of 1913 in Ohio and repeated during the summer of 1914 in New York, are reported in a paper by Joseph Rosenbaum and C. L. Zinnmeister, published in the Journal of Agricultural Research for October 25.

STATION PUBLICATIONS.

(Contribution from States Relations Service.)

The station publications noted in this list are not distributed by the Department of Agriculture, but can usually be obtained by department workers, as far as the supply will permit, by applying to the stations issuing them. An address list of the stations will be furnished upon request by the States Relations Service. Copies of these publications can be consulted in the library of that service and also ordinarily can be borrowed from the department library.

CROPPING SYSTEMS AND SOIL STUDIES.

- The Determination of Availability of Nitrogenous Fertilizers in Various California Soil Types by Their Nitrifiability. By C. B. Lipman and P. S. Burgess. (California Station Bulletin 260, pp. 107-127.)
- Soils of Franklin County. By S. C. Jones. (Kentucky Station Bulletin 195, pp. 201-235, pl. 1.)
- Effect of Temperature on Some of the Most Important Physical Processes in Soils. By G. J. Bouyoucos. (Michigan Station Technical Bulletin 22, pp. 3-63, figs. 16.)
- Quack Grass Eradication: I, Experimental Evidence and Conclusions; II, Tabulated Statement of Operations on the Fields under Rotation. By A. C. Army. (Minnesota Station Bulletin 151, pp. 3-82, figs. 26.)
- Forage Crops. By J. R. Ricks. (Mississippi Station Bulletin 172, pp. 3-23, figs. 5.)
- The Control of Soil Washing. By M. F. Miller. (Missouri College Station Circular 78, pp. 12, figs. 9.)
- Winter Grain in South Dakota. By A. N. Hume et al. (South Dakota Station Bulletin 161, pp. 226-261, figs. 11.)

ANIMAL INDUSTRY.

- Improving the Kansas Egg. By W. A. Lippincott. (Kansas Station Circular 51, pp. 10, figs. 6.)
- The Ration and Age of Calving as Factors Influencing the Growth and Dairy Qualities of Cows. By C. H. Eckles. (Missouri College Station Bulletin 135, pp. 91, figs. 27.)
- The Farmer's Poultry House. By H. L. Kempster. (Missouri College Station Circular 75, pp. 13, figs. 19.)
- Feeding for Egg Production. By H. L. Kempster. (Missouri College Station Circular 76, pp. 12, figs. 2.)
- Lamb Feeding Experiments: I, Fattening Western Lambs; II, Fattening Native Lambs; III, A Comparison of Native and Western Lambs. By H. J. Granlich. (Nebraska Station Bulletin 153, pp. 3-26.)
- Marketing the 1915 Hog Crop. By W. H. Peters. (North Dakota Station Circular 9, pp. 14, figs. 9.)
- Raising Dairy Heifers—Cost, Feeding, and Care. By C. C. Hayden. (Ohio Station Bulletin 289, pp. 30, figs. 5.)

FRUITS AND VEGETABLES.

- Papago Sweet Corn, A New Variety. By G. F. Freeman. (Arizona Station Bulletin 75, pp. 451-465, pls. 3, figs. 2.)
- Walnut Culture in Arizona. By J. J. Thornber. (Arizona Station Bulletin 76, pp. 469-503, pls. 2, figs. 9.)
- Grape Pruning—The Spur and Long Cane Systems Compared. By T. J. Maney. (Iowa Station Bulletin 160, pp. 209-231, figs. 13.)

Senile Changes in Leaves of *Vitis vulpina* and Certain Other Plants. By H. M. Benedict. (New York Cornell Station Memoir 7, pp. 277-370, figs. 6.)

INSECTS.

- The Grass Worm or Fall Army Worm. By W. E. Hinds and J. A. Dew. (Alabama Station Bulletin 186, pp. 61-92, pls. 4, fig. 1.)
- Boll Weevil Control by Cotton Stalk Destruction. By W. E. Hinds. (Alabama Station Circular 33, pp. 42-47, figs. 2.)
- How Contact Insecticides Kill: III, Relating evidence, further, of certain properties of carbon disulphid, gasoline, and a few other fluids, as well as temperature and some dry powdered contact insecticides, by means of which the insecticidal action of these agents is accomplished after their absorption into the insect tissues, or after mere application; also brief suggestions for possible practice. By G. D. Shafer. (Michigan Station Technical Bulletin 21, pp. 3-67, pl. 1, figs. 3.)

PLANT AND ANIMAL DISEASES.

- A Bibliography of Recent Literature Concerning Plant-Disease Prevention, by C. C. Rees and W. Macfarlane; A Bibliography of Non-Parasitic Diseases of Plants, by C. W. Lantz. (Illinois Station Circular 183, pp. 2-111.)
- Bacillary White Diarrhea (*Bacterium pullorum* Infection) in Young Chickens in Massachusetts. By G. E. Gage and Beryl H. Paige. (Massachusetts Station Bulletin 163, pp. 48, pls. 3, fig. 1.)
- Experiments on the Control of the Root-knot Nematode. By J. A. McClintock. (Michigan Station Technical Bulletin 20, pp. 3-23.)
- Some Ginseng Troubles. By E. A. Bessey and J. A. McClintock. (Michigan Station Special Bulletin 72, pp. 3-15, figs. 5.)
- A Bacterial Disease of Stone Fruits. By F. M. Rolfs. (New York Cornell Station Memoir 8, pp. 377-436, figs. 12.)
- Fall Spraying for Peach Leaf Curl. By D. Reddick and L. A. Toan. (New York Cornell Station Circular 31, pp. 65-73, figs. 2.)
- Collar-blight and Related Forms of Fire-blight. By C. R. Orton and J. F. Adams. (Pennsylvania Station Bulletin 136, pp. 3-23, figs. 14.)
- Preliminary Note on Leaf Invasions by *Bacillus amylovorus*. By F. D. Heald. (Washington Station Bulletin 125, pp. 3-7, pls. 2.)
- Acidosis in Omnivora and Herbivora and Its Relation to Protein Storage. By H. Steenbock et al. (Wisconsin Station Research Bulletin 36, pp. 19.)
- Germination and Infection with the Fungus of the Late Blight of Potato (*Phytophthora infestans*). By I. E. Melhus. (Wisconsin Station Research Bulletin 37, pp. 64, figs. 8.)

INSPECTION AND METEOROLOGY.

- Standard Insecticides and Fungicides v. Secret Preparations. By G. P. Gray. (California Station Circular 141, pp. 4.)
- Commercial Feeding Stuffs. By W. R. Jones, Jr., et al. (Indiana Station Bulletin 181, pp. 523-835.)
- Kansas Live Stock Remedy Law, with List of Remedies Registered April 1, 1915. (Kansas Station Circular 50, pp. 15.)
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